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REPORT OF SURVEY CONDUCTED AT

THE TRI-CITIES
TENNESSEE/VIRGINIA REGION
JOHNSON CITY, TN

JANUARY 2001



Best Manufacturing Practices

1998 Award Winner



INNOVATION IN AMERICAN GOVERNMENT

BEST MANUFACTURING PRACTICES CENTER OF EXCELLENCE
College Park, Maryland
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Foreword



This report was produced by the Office of Naval Research's Best Manufacturing Practices (BMP) Program, a unique industry and government cooperative technology transfer effort that improves the competitiveness of America's industrial base both here and abroad. Our main goal at BMP is to increase the quality, reliability, and maintainability of goods produced by American firms. The primary objective toward this goal is simple: to identify best practices, document them, and then encourage industry and government to share information about them.

The BMP Program set out in 1985 to help businesses by identifying, researching, and promoting exceptional manufacturing practices, methods, and procedures in design, test, production, facilities, logistics, and management – all areas which are highlighted in the Department of Defense's 4245.7-M, *Transition from Development to Production* manual. By fostering the sharing of information across industry lines, BMP has become a resource in helping companies identify their weak areas and examine how other companies have improved similar situations. This sharing of ideas allows companies to learn from others' attempts and to avoid costly and time-consuming duplication.

BMP identifies and documents best practices by conducting in-depth, voluntary surveys such as this one at the Tri-Cities Tennessee/Virginia Region, Johnson City, Tennessee conducted during the week of January 22, 2001. Teams of BMP experts work hand-in-hand on-site with the company to examine existing practices, uncover best practices, and identify areas for even better practices.

The final survey report, which details the findings, is distributed electronically and in hard copy to thousands of representatives from industry, government, and academia throughout the U.S. and Canada – *so the knowledge can be shared*. BMP also distributes this information through several interactive services which include CD-ROMs and a World Wide Web Home Page located on the Internet at <http://www.bmpcoe.org>. The actual exchange of detailed data is between companies at their discretion.

The Tri-Cities Tennessee/Virginia Region continues to set new, more aggressive goals and metrics to ensure the continued success and innovation of its region. In addition to these projects, the Region has implemented numerous organizations to actively promote its cultural heritage. Among the best examples were the Region's accomplishments in Advanced Visualization Laboratory; Greene County Partnership; Planning and Development Districts; and Academic Incentive Programs.

The BMP Program is committed to strengthening the U.S. industrial base. Survey findings in reports such as this one on the Tri-Cities Tennessee/Virginia Region expand BMP's contribution toward its goal of a stronger, more competitive, globally-minded, and environmentally-conscious American industrial program.

I encourage your participation and use of this unique resource.

A handwritten signature in cursive script that reads "Anne Marie T. SuPrise".

Anne Marie T. SuPrise, Ph.D.
Director, Best Manufacturing Practices

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Section 1

Report Summary

Background

Back in the early days of the Nation, Tennessee and Virginia were part of the wild frontier and home to the earliest pioneers. Tennessee derived its name from *tana-see*, an old Yuchi Indian word meaning The Meeting Place, while Virginia was named by Sir Walter Raleigh in honor of England's Virgin Queen, Elizabeth I. What became the tri-cities region of northeastern Tennessee and southwestern Virginia is an area of natural beauty nestled in the Appalachian Mountains and rich in history. Greeneville has the only monument in the United States which honors both the Union and Confederate armies. Abingdon features the Barter Theatre, where patrons once bartered items (e.g., ham, spinach) in exchange for theater tickets; and playwrights such as Noel Coward, Tennessee Williams, and George Bernard Shaw accepted the items as royalties. Lady Bird Johnson once bartered a potted plant to see a play. Jonesborough is the oldest town in Tennessee, and was once the capitol of the State of Franklin. The State, named for Benjamin Franklin, never received congressional approval but came very close to becoming the fourteenth state of the Union. Bristol is legally two cities that straddle the Tennessee-Virginia stateline, but share the same main road aptly named State Street. The city was originally established in 1771 as a trading post along the Wilderness Road blazed by Daniel Boone.

Not long ago, the communities of northeastern Tennessee and southwestern Virginia fought amongst themselves in turf-guarding rivalries. But often, none were large enough or strong enough to achieve certain goals on their own. Around the early 1990s, an active movement toward regionalism began as the communities realized the benefits of working together toward common goals. Today, the Tri-Cities Tennessee/Virginia Region consists of 14 counties, over 60 local governments, and 650,000 residents in northeastern Tennessee and southwestern Virginia. In 1999, the Tri-Cities Tennessee/Virginia Region became the first region ever to win the All-America City Award from the National Civic League. Participants for this award are

judged on citizen involvement, effective government performance, philanthropic and volunteer resources, a strong capacity for cooperation, and community vision and pride. During the competition, the Region's presentation highlighted its efforts to involve youth in the decision-making process; improve healthcare in isolated communities; create an interest in rural medicine among future physicians; and celebrate and preserve the Appalachian region's storytelling and musical traditions. The success of winning the All-America City Award has resulted in increased participation by the Region's communities.

The Tri-Cities Tennessee/Virginia Region continues to set new, more aggressive goals and metrics to ensure the continued success and innovation of its region. In addition to these projects, the Region has implemented numerous organizations to actively promote its cultural heritage. Among the best practices documented were the Region's Advanced Visualization Laboratory; Greene County Partnership; Planning and Development Districts; and Academic Incentive Programs. By working together, the Tri-Cities Tennessee/Virginia Region will continue to improve the quality of life throughout northeastern Tennessee and southwestern Virginia. The BMP survey team considers the practices in this report to be among the best in industry and government.

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Section 2

Best Practices

Production

Boone Watershed Partnership

The Boone Watershed Partnership is a unique alliance among local residents, recreational users, governmental entities, educators, industrial contributors, and other interested parties who are dedicated to improving and protecting the water quality and habitat of Boone Lake and its tributaries in northeastern Tennessee. Through various efforts, the participants of the Partnership have restored a once polluted and unsafe recreational area/water source, as well as continued to work together to identify pollution problems and solutions within the watershed area.

Boone Lake, a 4,600-acre reservoir in northeastern Tennessee, is part of a series of man-made lakes built in the 1950s and operated by the Tennessee Valley Authority for flood control, navigation, and hydropower generation. While the lake area consists of 130 miles of developed shoreline, the watershed area feeding Boone Lake covers 670 square miles. Given the small size of the watershed area, the close proximity of rapidly developing urban cities, as well as agricultural and animal waste runoffs, Boone Lake soon became vulnerable to a variety of water quality problems. Although point source pollution caused by urban wastewater sewage discharges was initially brought under control, the Boone watershed was still impacted by runoff from sediment, animal waste, agricultural precipitation, and failed septic systems in the area. To address this problem, the Tri-Cities Tennessee/Virginia Region established the Boone Watershed Partnership in 1995.

The focus of the Boone Watershed Partnership is to partner with local users; regional, state, and Federal entities; educators; and others to identify and address water resource issues in the Boone watershed. The Partnership's objectives include sharing information on water conditions and issues among resource agencies, water users, and the public; developing consensus on priorities and actions needed to address regional issues; marshaling resources to carry out needed actions; and promot-

ing awareness of the importance of water resources to the regional economy and to the quality of life. In addition, the participants of the Partnership work toward a community-based program of identifying and correcting pollution problems within the watershed area.

The Boone Watershed Partnership employs various programs to fulfill its objectives. Educating the public on environmental issues is generating the largest dividend in improving the water quality and habitat of Boone Lake and its tributaries. Several aggressive group/regional environmental programs help educate the residents of the watershed area as well as encourage private landowners to protect streamside vegetation, control erosion, and prevent pollution. The Partnership sponsors an annual one-day conservation camp where fourth-grade students from three local area counties learn about pollution, pollution prevention, conservation, and environmental issues. Local educators are also given the opportunity to attend a one-day, in-service environmental education session.

In 1998 and 1999, the Boone Watershed Partnership received the Tennessee Department of Environmental and Conservation's Aquatic Resource Preservation Award. As a result of the Partnership's efforts:

- Students gain real-world experiences, problem solving skills, and greater respect for water resources, local government, and themselves;
- Educators gain college credit toward continuing education requirements, enhanced teaching skills and tools, and monetary awards toward science and ecology clubs; and
- Communities gain cleaner water, improvement of aquatic habitats, and cost-sharing opportunities.

Facilities

Solid Waste Center

The City of Bristol, Virginia has realized a significant cost savings as well as created a revenue stream by utilizing an existing limestone quarry as a solid waste center. Design features of the facility include state-of-the-art containment materials, sensor tech-

nology, and a gradient control system. *The City estimates that the landfill will volumetrically meet its waste disposal needs for the next 30 years.*

In 1989, the City of Bristol, Virginia realized it was rapidly exhausting the air space in its existing landfill. Wanting to avoid a logistical and financial emergency with Washington County, Virginia, Bristol scouted out 50 sites as possible locations for a new landfill. Further investigation, however, revealed that more than 20 of these sites were unacceptable due to the region's terrain. After many strategic planning sessions, the City decided to pursue an ambitious course of action. Immediately adjacent to the existing landfill lay an abandoned limestone quarry. Three prominent points made this site desirable:

- The imminent promulgation and implementation of U.S. EPA Subtitle D Regulations would render small jurisdiction ownership and management of individual landfills prohibitively expensive, opening the door for larger, regional facilities. Regionalism was imperative since Bristol realized it could not afford to operate a conventional facility.
- The U.S. EPA Subtitle D Regulations were primarily performance rather than specification based, and would allow greater engineering flexibility than had previous standards.
- The prospect of Bristol becoming dependent on a second party and having to pay for the costs of transfer and subsequent disposal was undesirable.

The limestone quarry is approximately 800 x 2,100 feet overall with an average depth of 350 feet (eight million cubic yards of air space). Bristol decided that the dimensions of the quarry met the Region's waste volume requirements, so it purchased an option to buy the quarry and the surrounding 137 acres. While fulfilling regulatory requirements, Bristol focused on the marketing aspect of the proposed solid waste center. The City determined that it needed to process 200 tons of waste per day including its own in order to break even.

The quarry landfill design features state-of-the-art containment materials, sensor technology, and a gradient control system. In addition, Bristol realized a significant cost savings for this project as almost no excavation of the site was necessary. Construction began on September 9, 1996 and the solid waste center became operational on March 2,

1998. Other aspects of the facility include an on-site incinerator and tire shredder. Additional construction projects, such as a landfill gas collection system, are also planned. Bristol processes approximately 600 tons of solid waste a day and estimates that the quarry landfill will serve the region for the next 30 years. The revenue generated by processing regional waste has also resulted in a significant net profit to the City.

Management

1998 Economic Summit

The 1998 Economic Summit continued the vision of the Technology Center as being the model for America's 21st century. In Greater East Tennessee from Chattanooga to Oak Ridge/Knoxville to the Tri-Cities Tennessee/Virginia Region, working partnerships between public and private sectors are sharing resources to create jobs and opportunities.

In 1994, the Tri-Cities Tennessee/Virginia Region was in the midst of evolutionary economic restructuring. The communities realized that they needed to come together as a region for economic survival or they would cease to be viable as individual neighborhoods. They also recognized that unique opportunities existed for the region if they participated as part of the overall technology corridor which ran from southwestern Virginia through Tennessee to northeastern Alabama. The key enabler of the region's economic success lies in the collaborative leadership and commitment from key policy/opinion makers across all sectors (e.g., government, industry, academia, the public).

In May 1998, the Tri-Cities Tennessee/Virginia Economic Summit was held to demonstrate the entrepreneurial leadership in the Technology Corridor, strengthen regional relationships, focus on linking the resources of the Technology Corridor to the world, and showcase the region's unique blend of natural and technological resources. The following segments were addressed:

- The Science, Medicine, and Technology Segment provided an overview of the future direction of medicine and its related technologies with perspectives on implications for the region and state.
- The Nature, History, and Tourism Segment presented an inventory of natural resources (e.g., natural, cultural, historical) and tourism

potential, within the Tri-Cities Tennessee/Virginia Region, that provide regional economic development opportunities and protect natural resources.

- The Innovative Regional Partnerships Segment showcased partnerships within the Tri-Cities Tennessee/Virginia Region as a way of focusing local government officials on the potential of local government to positively impact the community.

The efforts of these working partnerships are evidenced by honors bestowed upon the region in 1999. At that time, the Tri-Cities Tennessee/Virginia Region became the first region ever to win the All-America City Award from the National Civic League. These partnerships are setting new, more aggressive goals and metrics to ensure the continued success and innovation of the region.

Academic Incentive Programs

The Tri-Cities Tennessee/Virginia Region implemented three premier education incentive programs which effectively motivate, recognize, and encourage students to achieve higher levels of academic excellence. Each program takes advantage of the cooperative spirit that already exists in the region by establishing partnerships among businesses, academic institutions, students, and parents.

The three premier education incentive programs of the Tri-Cities Tennessee/Virginia Region consist of: (1) the Teachers, Industries, Parents, and Students Program; (2) the Grades of Academic Leaders Card Program; and (3) the Appalachian Inter-Mountain Scholars Program. By establishing partnerships within the community, these Programs motivate, encourage, and recognize K-12 students to achieve higher levels of academic excellence.

- Teachers, Industries, Parents, and Students Program:

In the past, the Tri-Cities Tennessee/Virginia Region used traditional educational programs where business representatives visited local schools and shared their experiences with students. Although somewhat effective, the practice did not adequately equip the teacher to motivate and encourage the students in the day-to-day learning process. To address this need, the Teachers, Industries, Parents, and Students Program was established in 1994 by the Chamber of Commerce in partnership with

Johnson City and the Washington County schools.

Through the Teachers, Industries, Parents, and Students Program, local educators are placed in over 40 businesses where they acquire information on educational and work skill requirements needed in today's workforce. Each August prior to the start of the new school year, teachers spend half a day gaining hands-on experience in various aspects of the workplace. Through this Program, they are exposed to real-life situations that require mathematics, reading, problem solving, public speaking, responsibility, and communication skills. Teachers can then incorporate these experiences into their teaching/learning processes throughout the year to show students that what is learned in the classroom can be applied in the workplace.

Initially, the Teachers, Industries, Parents, and Students Program was optional and included 200 educators annually. Over the years, businesses have seen a better educated and prepared workforce and have, therefore, made more openings available as well as advocated the Program as a mandatory requirement for all teachers. More than 1,000 educators now complete the Program annually. The Teachers, Industries, Parents, and Students Program is recognized by teachers as an extremely valuable tool for motivating and encouraging student achievement in the classroom.

- Grades of Academic Leaders Card Program:

The Grades of Academic Leaders Card Program was established in 1988 by Nuclear Fuel Services, Inc. as a way to show its commitment to public education. Encompassing five school districts in the Tri-Cities Tennessee/Virginia Region, the Program integrates student achievement with recognition and rewards from school administrators, the local business community, and peers. The focus is to promote academic excellence by rewarding K-12 students who achieve certain goals during a grading period. Students who achieve straight A's are awarded a Goal Card, and those who attain either a B honor roll, most academic improvement in a class, or perfect attendance receive an Achiever Card. The Goal Card (laminated photo-ID) and the Achiever Card (non-laminated ID) allow students to receive free or discounted merchandise or services from participating area merchants. Each card is

valid for a specific grading period. In addition, students who achieve straight A's for the entire school year become eligible for special prizes and scholarships, and are treated to the annual Goal Card Day hosted by Nuclear Fuel Services and other sponsors.

As the main sponsor, Nuclear Fuel Services provides all necessary materials (e.g., cards, photo laminator); works with school administrators and teachers; lines up merchants to participate; and solicits local television and radio stations to promote the Program. Since 1988, the number of students in the Tri-Cities Tennessee/Virginia Region who have attained straight A's has increased by 10%; attendance has grown from 92% to 97%; and more than \$30,000 in college scholarships has been provided by local banks and educational institutions. Nuclear Fuel Services has also provided leadership by setting up the Grades of Academic Leaders Card Program in 43 states, and sharing it at state and national conferences. The Program has also been recognized by the Kraft Food Corporation as an effective business/education partnership.

- **Appalachian Inter-Mountain Scholars Program:** The Appalachian Inter-Mountain Scholars Program was established in 1994 to address area businesses' concerns that new hires lacked basic mathematic and reading skills required for employment. The Program is oriented toward all high school students, but particularly encourages C and D students to get involved. The process starts in eighth grade, where business representatives walk students through a budget on how they would support themselves as adults, what type of lifestyle they would want, and how they would support their needs. In addition, the process correlates the value of science and mathematics with better jobs and pay. Throughout high school, educators continue the reinforcement through guidance, pep talks, and recognition.

Students become Appalachian Inter-Mountain Scholars by choosing to complete a pre-determined core curriculum (e.g., mathematics, science, social studies, language arts, computer literacy) which includes maintaining at least a C in specific mathematic and science courses; maintaining at least a 95% attendance record over the four-year period; performing 20 hours per year of community service; and avoiding

out-of-school suspension. Graduates of the Program gain a fundamentally sound academic education; earn recognition for their good grades, attendance, and behavior; and receive preferential treatment in the area job market. The demand for high-skilled, dependable employees is greater than ever.

The Appalachian Inter-Mountain Scholars Program has been effective at encouraging students to work harder. The number of graduates has increased from 194 in 1994 to 594 in 2000, which accounts for 33% of all students in the area where the Program is offered. In addition, the Appalachian Inter-Mountain Scholars Program is an excellent vehicle for business, community, and education representatives to work together and advocate a significant impact on the region's education. The Program has received recognition by the Governor of Tennessee, and is a 1999 recipient of the Best Practice Award from Tennessee Education Edge.

Access Program

The Access Program has achieved substantial goals in providing social services to a very remote area of northeastern Tennessee. The satisfaction factor of both the recipients and sponsor, First Tennessee Area on Aging, is to be commended. For this Program to remain viable as a stand-alone agency, major intervention at the Federal, state, and local government levels is required.

The Access Program is a cooperative effort partially funded by the Federal government to provide assistance to aging Americans. This pilot program came about as a result of a Robert Wood Johnson Foundation grant. Of the eight original charters, First Tennessee Area on Aging is the remaining participant that provides this Program through Older American Act funding.

First Tennessee Area on Aging opens the door for older persons to receive assistance in areas such as information on financial relief; referral to other help agencies and outreach programs; individual quality of life assessments; and case management studies and follow-ups. Additionally, this Agency provides information to recipients on community-oriented services (e.g., warm meals, fuel allotments); sets up appointments and arranges service when needed; and responds to requests from concerned

relatives/acquaintances that live outside the region. The Agency will assess an individual's need for supportive care, whether it be in the individual's home or other convenient facilities. In some cases, First Tennessee Area on Aging has arranged for local financial institutions to manage money for recipients.

The Access Program prides itself on the deep personal relationships and involvement which develop between the client and the agency personnel. This interaction is typical for the lifestyle (i.e., taking care of our own) in this region of northeastern Tennessee. The Access Program is an excellent vehicle to ensure an improvement in the quality of life for older people, particularly in the area of healthcare.

Advanced Visualization Laboratory

The Digital Media Program of the Advanced Visualization Laboratory is a world-class animation/multimedia course of study leading to bachelor or master degrees awarded by East Tennessee State University. The Program is supported by a partnership among the University, the digital media industry, Johnson City, and private gift donors.

In 1993, the Department of Technology at East Tennessee State University had a vision for a state-of-the-art program in engineering design graphics. The existing CAD-drafting program attracted less than 50 undergraduate and no graduate majors. The Faculty and Industrial Advisory Committee recommended a complete program revision which would prepare students for the advanced graphic technologies of the new millennium. The vision also included collaboration with the University's Department of Computer Science program in software engineering. The costs for hardware and software to support the proposed changes were prohibitively high, averaging approximately \$150,000 per student workstation. The solution was an extensive partnership initially with Silicon Graphics (hardware) and Alias/Wavefront (software). Currently, the Program is supported by a partnership among the University, the digital media industry, Johnson City, and private gift donors. East Tennessee State University contributed \$200,000, and the other partners contributed \$5.3 million to launch the Digital Media Program of the Advanced Visualization Laboratory.

The Digital Media Program became an instant success. Enrollment soared to over 350 under-

graduate and 40 graduate majors, while the faculty grew from three to six. The number of partnerships also expanded, resulting in a new state-of-the-art facility connected to Johnson City's Adelphia Center. Through this animation/multimedia course, students gain practical experience exploring new media applications with regional industries and governmental agencies. One highly prosperous business has already evolved from the Digital Media Program, and the Program's successful collaborative effort with the Computer Science Department has produced new undergraduate and graduate degree programs in Information Technology. The placement of Advanced Visualization Laboratory graduates is 100%.

The success of the Digital Media Program can be directly attributed to the vision and partnership among East Tennessee State University, local government, industry involvement, and private donors. As a result, international student enrollment and workforce education have become a catalyst for regional economic development.

Economic Development and Preservation Through Storytelling

The National Storytelling Festival has brought about economic development success as well as preserved the heritage of Jonesborough. Through this festival, the town is promoting a disappearing art form while maintaining a genuine small town atmosphere that has been lost to most of America.

Jonesborough, founded over 200 years ago in the heart of the southern Appalachian Mountains, is the oldest town in Tennessee. After a long and distinguished history, Tennessee's first town began to decay in the late 1960s. Malls in neighboring communities began luring Jonesborough's customers away and eroding the town's economy. Soon, local shops were empty and buildings fell into disrepair. Not content to let the deterioration go unchecked, the town leaders devised a plan to reverse the decline. They surmised that Jonesborough's future must lie in its past. By the early 1970s, the town leaders set up the Jonesborough Civic Trust to undertake this renewal to preserve the old town, restore its historic buildings, and build a new economy based on tourism.

The first attempts were centered on a weekend-long festival celebrating Jonesborough's history and heritage. After three years, however, the popular-

ity of the event had grown to the point that the organizers felt changes were needed in order to attract more people. The idea of incorporating storytelling as an event came about after one of the organizers heard a radio broadcast of a popular southern storyteller. In 1973, Jonesborough held its first storytelling festival, drawing approximately 60 attendees to this first-of-a-kind event. Two years later, the National Storytelling Association was formed to spearhead America's storytelling renaissance. This association was restructured in 1998 into two sister organizations: (1) the National Storytelling Network which serves and supports the growing community of storytellers and storytelling professionals throughout the world, and (2) the International Storytelling Center which promotes the power of storytelling and the creative applications of this ancient tradition to enrich the human experience in the home, at the workplace, and within the world community.

Today, the National Storytelling Festival plays a major role in the re-development of Jonesborough, drawing 10,000 visitors to this region annually. The three-day event brings in more than \$2 million to the local economy, and has resulted in the restoration and preservation of the town's historic buildings. The International Storytelling Center continues to make improvements to the festival based on feedback gathered from local businesses and from suggestion boxes set up for attendees. In addition, a \$10-million storytelling complex is presently under construction with plans to provide storytelling activities throughout the year.

Electronic Village of Abingdon

The Electronic Village of Abingdon is an electronic network that provides public access to a full range of computerized information and communications services. This affordable business tool uses electronic technologies to benefit citizens and businesses within its Abingdon and Washington County service area.

In February 1996, the Town of Abingdon, Virginia realized the need for improved communications to enrich the economy of the town and the Washington County area. A plan, entitled Electronic Village of Abingdon, was developed to provide affordable broad bandwidth Internet/networking connections via a fiber optic cable. The plan called for the cable to be installed with minimal destruction to the town's historical features and to keep installation costs as low as possible. In late 1997, a fiber optic cable was

laid through a ten-block area consisting primarily of professional and residential businesses. Any building within 150 feet of this fiber backbone had accessibility to the network's high-speed connections.

The Electronic Village of Abingdon brings high-speed networking service to the community at processing speeds of either ten or 100 megabytes per second, four times faster than conventional modem speeds, depending on the type of service elected. Using digital satellite links, both the citizens and businesses within the community can connect to any permissible computer within Abingdon. These aspects not only tie individuals to business contacts, but greatly enhance the community's capability to access education and civic organizations. This service is linked to 11 counties in Tennessee, providing educational programming for schools and the feasible transfer of technology information to industries within the region. The most advantageous feature is tele-medicine which involves the real-time transfer of patient files and medical history to other area hospitals of the region. The Electronic Village of Abingdon provides full-time e-mail and Internet capabilities, and allows for electronic file transfers, remote computer operations, and video conferencing at the fastest connections possible.

The Electronic Village of Abingdon network differs from others as its technology and scope of network coverage is much larger than a single or corporate business unit would attempt. The cost is comparable to conventional ISDN web service, typically \$35 per month for a single computer ten-megabyte service and a one-time installation fee of \$75. Requirements for using this network include a fiber transceiver or media converter (about \$175) and a Pentium-class computer with a minimum of 16 megabytes of RAM plus Windows 98, Windows 95, or Windows for Workgroups software for any IBM compatible equipment. I-MAC computers come equipped with transceiver capabilities and Internet browsers, therefore e-mail programs can be downloaded once connected.

Multiple computers require a hub interconnection (starting around \$125), but only one fiber transceiver is required. The monthly service fee decreases to \$22 for two to three computers, and to \$16 for four to six computers. Although the monthly service fee significantly increases for connections over seven, the service fee is still reasonable for the speeds, technical support, and service provided. Since the Electronic Village of Abingdon was implemented, usage compared to availability is currently at 70%.

Greene County Partnership

The Greene County Partnership plays a significant role in the economic and community development of Greeneville and Greene County. The Partnership came about by dissolving the existing four non-profit entities and merging them into one organizational structure with a broadly based board of directors to develop and oversee financing, staffing, housing, planning, policy, and program.

During the early 1990s, Greene County in northeastern Tennessee began experiencing a poor economy and double-digit unemployment rates. Local businesses were downsizing; local economic development activity was fragmented and non-responsive to the global paradigm; and the family farm was no longer a viable option despite that Greene was one of the most productive agricultural counties in the state. The leadership in Greene County recognized the need to start over economically to meet these unprecedented challenges. In 1994, the existing four non-profit entities were dissolved and merged into the Greene County Partnership.

The Greene County Partnership operates as a single organization with one broad-based board, one budget, and one staffing plan. By implementing this approach, the community leaders strived to eliminate duplicate human/financial resources; be all-inclusive and build consensus; rebuild the local economy by correcting weaknesses and creating positive change to make Greeneville/Greene County more attractive to business and industry; and expand funding through public/private sources to maintain a professional staff, facilities, and resources. The Partnership's first high visibility activity was the Goals Conference, in which the greater community was invited to participate in a one-day facilitated forum to define specific goals and an operating plan for the organization. One idea suggested at this Conference evolved into Partners In Education, a state-recognized job shadowing program that has created 93 master partnerships among schools, businesses, and industry.

The Greene County Partnership has become quite successful as a results-oriented economic and community development organization. Since 1993, the Partnership has recruited 16 new industries and assisted in dozens of local expansions; obtained 7,000 jobs and over \$400 million in new capital investments; implemented the Annual Manufac-

turing Wage & Benefit Survey to provide timely and confidential wage/benefit information to local companies; and achieved a top ten ranking in the U.S. for small markets for new industrial locations and expansion activities. Millions of new tourism dollars have also been incorporated into the local economy through the Partnership's efforts to recruit festivals, conferences, and sporting events.

Managing an Industrial Park

The Tri-County Industrial Park is a regional economic development effort among four local governments. The goal is to bring environmental and economic benefits to the area by attracting new industrial entities. Currently, the effort has resulted in more than 2,500 jobs with an annual payroll of over \$65 million.

The Tri-County Industrial Park is centrally located in the Tennessee/Virginia Metropolitan area. Completed in 1970, the Park was constructed as a regional economic development effort among four local governments and a grant from the U.S. Economic Development Administration. Jointly, the local governments acquired the 750 acres of land from the Piney Flats section of Sullivan County, and each contributed to the infrastructure costs. This joint venture is believed to be one of the earliest examples of cooperation among counties within the State of Tennessee.

Prospective tenants to the Tri-County Industrial Park must gain approval from each of the local governments. This approach is used to ensure that industries which occupy the Park are environmentally and economically beneficial to the region. Additionally, the economic development focus of the Park is to bring new industrial entities to the area. Therefore, existing area industries are ineligible to apply for sites. Purchase cost of each parcel is \$12,500 per acre. Creative land management options result in tax incentives to the tenants for the first five years.

Today, the Tri-County Industrial Park is home to 27 companies, which equates to more than 2,500 jobs with an annual payroll of over \$65 million. The local governments estimate that the remaining 150 acres will be sold within the next five years. The Industrial Park is also designated as a foreign trade zone.

Planning and Development Districts

The Tri-Cities Tennessee/Virginia Region features three exemplary Planning and Development Districts. By collaborating with regional organizations and groups, these Districts deliver unbiased, win-win programs which positively affect the entire region and its citizens.

Nowadays, the Tri-Cities Tennessee/Virginia Region faces increasingly complex issues and needs regarding economic development and quality enhancement of life. Its efforts must go beyond traditional programs and guidelines, and continually strive to find newer ways to be responsive to an environment of rapid change. Economic development is no longer limited to business development (e.g., annexing land, providing utilities), but also must be responsive to the needs and concerns of citizens, communities, and counties by implementing a full range of planning and development activities. The new challenge is to deliver coordinated and effective programs that positively impact the entire region and its citizens.

Within the Tri-Cities Tennessee/Virginia Region are three exemplary Planning and Development Districts that have met these challenges with similar approaches:

- Lenowisco Planning District #1 facilitates the development activities of Lee, Scott, and Wise Counties in southwestern Virginia.
- Mount Rogers Planning District #3 facilitates the development activities of Bland, Carroll, Grayson, Smyth, Washington, and Wythe Counties in southwestern Virginia.
- First Tennessee Development District facilitates the development activities of Carter, Greene, Hancock, Hawkins, Johnson, Sullivan, Unicoi, and Washington Counties in northeastern Tennessee.

Similarly, each Planning and Development District handles the development of comprehensive plans, facilitates assistance for its area, and is faced with a different set of challenges because of respective state laws, demographics, and cultures. However, the strength of each District is its ability to collaborate with regional organizations and groups such as planning offices, learning institutions, businesses, and state and Federal agencies. Cooperative relationships are maintained through formal and informal contacts, partnerships, and memoranda of understanding. Programs become team

projects. Each team member is recognized as a valued service provider with resources, knowledge, and expertise who can respond to the region's economic and community development issues and needs.

Each Planning and Development District is known for its unbiased approach and ability to find win-win solutions for all involved. As a result, these Districts have organized and facilitated numerous activities for their respective regions, especially in the areas of technical assistance, education, industrial development, recreation, social services, environment, tourism, zoning, housing, agriculture, communications, consulting, and workforce development.

Service Learning

Service Learning is a form of experiential education in which students engage in activities that address human and community needs, together with structured opportunities intentionally designed to promote student learning and development. Reflection and reciprocity are key concepts of Service Learning.

Over the years, Americans have changed from being members of a society to members of an economy. Disengagement of citizenry is illustrated through fewer voters, decrease in current event discussions, increase in solitary lifestyles, feelings of powerlessness, and failure to see the need for collective action and beliefs. The lack of family values and priorities, perspective on public life, and skills of communication are becoming threats to family and community. In 1991, with seed money from the Corporation for National Service, East Tennessee State University began experiential education in Service Learning. Building on the experiences of other higher learning schools, the University tailored its program and coursework to fit the needs of its faculty, its students, and the community. In 1992, Service Learning became an integral part of the University's educational process.

The Service Learning experience for the student must meet a community need; provide service to others; engage the student with hands-on learning; be neither partisan nor include fundraising activities; be linked to an academic course; and have pre-identified learning objectives, measurable outcomes, and written documentation. The result is that all parties benefit from Service Learning. Students get to experience relationships and their impact on the

community, become more culturally aware of their environment, and understand what is required to be a responsible citizen. The University broadens its concept of education, improves linkages and partnerships within the community, and establishes a common thread of purpose across the curriculum. The community gains increased resources for problem solving as well as commitment and support from its future citizens. Today, Service Learning has been integrated into more than 15 courses at East Tennessee State University, plus ten other non-accredited, service-learning projects. The University has also begun partnering with high schools. A tracking system is in place to start collecting data to quantify results. In the meantime, the University continues to receive overwhelming accounts of positive feedback from students and faculty who have participated in the Service Learning courses.

Southwest Virginia Higher Education Center

The Southwest Virginia Higher Education Center is meeting the needs of southwestern Virginia by providing higher level educational opportunities through a partnership with Virginia universities and colleges. The enrollment for courses offered is increasing significantly, attesting to the efficacy of the program.

The concept of the Southwest Virginia Higher Education Center was created in 1991 by the Virginia General Assembly to enhance higher education and regional economic development in south-

western Virginia. This region was originally seen as an economically depressed area. The legislature recognized that in order to successfully change the economic status of the region, the educational level of the residents had to be increased (Figure 2-1). The community college system had been providing educational opportunities up to an associate's degree. However, to continue the educational path to a bachelor's or master's degree required people to travel great distances to a major university. Distance became a prohibitive factor for working adults of the area to pursue additional education. In 1992, a \$9.9 million capital project was initiated to build the Southwest Virginia Higher Education Center.

The Southwest Virginia Higher Education Center offers 62 degreed programs from its partner institutions: University of Virginia, Virginia Tech, Old Dominion University, Radford University, University of Virginia's College at Wise, George Mason University, Virginia Commonwealth University, and Emory and Henry College. The courses are taught by visiting professors from the partner institutions via satellite or Network Virginia, a high-speed video conferencing capability. The course offerings are dictated by performing a needs assessment of the businesses in the area including manufacturing firms, accounting firms, correctional facilities, and medical businesses.

Besides educational courses, the Southwest Virginia Higher Education Center also hosts conferences and special events. Since the target population is working adults, most course activities occur during evenings and on weekends. This arrangement leaves the Center available for other activities, such as conferences, during the day on Monday

through Friday. In 1999, the Center hosted 601 events in its conference facilities with 48,498 participants. In 2000, the number of events increased to 926 with 65,288 participants.

The Southwest Virginia Higher Education Center is fulfilling a need in southwestern Virginia. Enrollment has increased from 1,091 participants in 1999 to 1,586 in 2000. The academic partners also work together on course offerings with reciprocal agreements on the acceptability of courses for degree requirements.

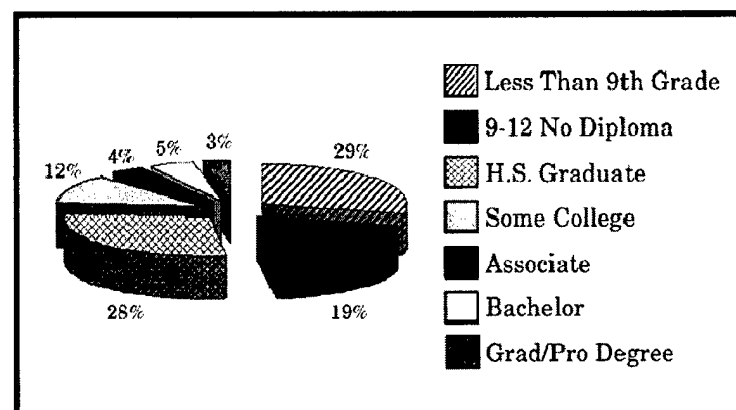


Figure 2-1. Educational Level: Age 25 & Over

Sowing Partnerships to Grow a Health System

East Tennessee State University's Colleges of Medicine and Nursing are key reasons for the economic vitality of the region. They provide critical support to the quality of life for residents and industry. Each has its own set of innovative practices and collaborative services that enhance both the university and the community.

During the early 1970s, the Tri-Cities Tennessee/Virginia Region experienced critical shortages of skilled healthcare workers and health services. By leveraging its partnering strength with the Mountain Home Veteran Affairs Medical Center as well as taking advantage of recently enacted Federal legislation, East Tennessee State University created the Quillen College of Medicine in 1974. The goal of this partnership was to provide healthcare to the people of northeastern Tennessee and southwestern Virginia, as well as meet the needs of the Veteran Affairs Medical Center. The first class of Quillen College of Medicine graduated in 1978, and marked the beginning of set goals established between East Tennessee State University and the Mountain Home Veteran Affairs Center. Expansion of these goals was greatly enhanced in 1991 when East Tennessee State University received the first of three community-based training grants, obtaining a \$9.3 million grant from the W. K. Kellogg Foundation.

Through the Kellogg grant, East Tennessee State University expanded its role and began partnering with regional healthcare providers (e.g., clinics, home healthcare, doctors, dentists, hospitals, schools), allowing the University to become a regional force in healthcare. The University used these partnerships as a growth and continuous improvement strategy, and made adjustments to degree programs in medicine, nursing, and public health to reflect the new direction. From the onset, university leadership continually reinforced the message that each department and unit were expected to establish relationships with non-university entities. In addition, these relationships were to be long-term commitments. As part of East Tennessee State University's efforts to provide health services to the communities, students from the Division of Health Sciences participated in community-based learning experiences and in-service learning programs. These experiences and pro-

grams allowed medical students to go into the communities and homes with local healthcare providers and assess the true health needs of the people. Instead of treating a patient's symptom at the local clinic or hospital, students saw first-hand the real underlying reason(s) for the health problem (e.g., behavior induced, environmentally induced). This innovative program of the Rural Primary Care Track organized the curriculum to focus on the practical application of rural healthcare, the special needs of rural communities, and how best to address these needs as a healthcare practitioner. In addition, the communications class is a unique method of teaching students how to effectively communicate with healthcare consumers and healthcare professionals of different disciplines. Students who participated in these programs and experiences have commented that when they graduated from medical school, they felt they had a one- to one-and-a-half year advantage over students who graduated from conventional medical schools.

The Quillen College of Medicine has developed a countability with its community partners, most likely because of East Tennessee State University's successful partnering history with the Mountain Home Veteran Affairs Medical Center. As a result of the partnerships, healthcare access for residents of the region increased from 37% to 65% of the population. Approximately 65% of the Quillen College of Medicine graduates go into primary care training, with 50% of the medical graduates and over 80% of the College of Nursing graduates remaining in the area as practitioners. In addition, nine new nursing centers in eight counties have been established to serve the communities. These centers have allowed underutilized and understaffed hospitals to become obsolete, and brought medical care to the local residents of the region.

Tourism

Tourism in northeastern Tennessee has become a vibrant industry through the leadership of the Northeast Tennessee Tourism Association; the dedicated efforts of the Board of Trustees, staff, members, and volunteers; and cooperation from the public and private sectors. These operations have contributed to significant community and economic growth in the region.

In 1977, the Upper East Tennessee-Southwest Virginia Council was chartered by the area Cham-

bers of Commerce, the First Tennessee-Virginia Development District, and the existing tourism industry to promote the region. Operations during the first year were on a volunteer basis. In 1978, the Town of Jonesborough began supplying staff support to the Council (with a full-time director in 1982) and office space in the Historic Jonesborough Visitors Center. That same year, the Membership Campaign was initiated. Tourism steadily grew under this structure with an operating budget of \$45,000 and a state grant of \$15,000.

Continued growth and new opportunities in the region led to the restructuring of the Council in 1992 as well as a new name — the Northeast Tennessee Tourism Association. The following year, the Association moved from the Historic Jonesborough Visitors Center into permanent headquarters provided by Jonesborough at a leased cost of \$1 per year. Here, the Association began developing long-range strategic plans to promote the region. Partnerships with local, regional, and state agencies resulted in cooperative advertising in national publications. These private and public partnerships soon combined resources to maximize dollars and minimize duplication. Infrastructure enhancements throughout the Tri-Cities Tennessee/Virginia Region also refined the tourism industry with new and improved roads, expansions/upgrades at area attractions, retail development, and construction of hotels, restaurants, and convention civic centers.

Although the Northeast Tennessee Tourism Association provides the leadership, it is the dedicated efforts of the Board of Trustees, staff, members, and volunteers which make the tourism operations in the Tri-Cities Tennessee/Virginia Region a success. Today, the Association has an annual operating budget of \$190,000 plus in-kind contribution and a state-matching grant of \$35,000. Membership has risen to 200 with involvement in co-op projects totaling \$320,000. The tourism operations are now all-encompassing (e.g., marketing, media relations, partnering, legislation) and serve as a catalyst to enhance community and economic development throughout the region. As a result, tourism economic impact figures increased from \$247 million to \$360 million during the past decade, while state and local taxes grew from \$21 million to \$32 million. In addition, the Northeast Tennessee Tourism Association launched new publications, expanded its brochure distribution outlets, and created the Pinnacle Awards to salute exemplary tourism performances.

Watauga Regional Library Network

The Watauga Regional Library partnered with East Tennessee State University to develop a regional library cooperative network to deliver state-of-the-art library management technology to the ten public library systems in the region. The network and its services were implemented in 20 months, a relatively short period of time given the major, simultaneous changes required to enhance the libraries, many of which were being automated for the first time.

The Watauga Regional Library is an agency of the Tennessee State Library and Archives of the State of Tennessee. Its mission is to enhance the ten public library systems in the northeast Tennessee counties of Carter, Greene, Johnson, Sullivan, Unicoi, and Washington. Prior to 1998, the scope of services provided by these ten public library systems ranged from minimal to state-of-the-art. Most were small, underfunded operations with minimal staff and no automated capabilities. Other obstacles included difficulty in obtaining collection materials among library systems; no source of regional collection information for the public; separate library catalogs with few online; and barriers that hindered library systems from networking and employing cooperative enterprises. In 1998, East Tennessee State University obtained the state-of-the-art Voyager library management system which provided the ideal partnering opportunity for the Watauga Regional Library to re-engineer its role in support of its mission.

The servers installed at East Tennessee State University for Endeavor Voyager were large enough to support the library automation needs for the Watauga Regional Library's members. The Library immediately focused on developing a collaborative structure among the public libraries to transform them into a cooperative system of interconnected resources. The resulting network maximized the resources of each library system so that everyone acquired state-of-the-art capabilities and online real-time access to collections and resources available throughout the system. By refocusing its operation, Watauga Regional Library doubled the amount of staff time it devoted to working directly with the public library systems and initiated a courier service that delivers interlibrary loans.

The network and resulting services were implemented over a 20-month period, a relatively short period of time given the major, simultaneous changes required to enhance ten public library systems. Watauga Regional Library became the system provider of communication networks and services including systems administration, web page editing, training, and catalog coordination. Each library's local computer network is connected via T1 lines to a central router at Watauga Regional Library. This router, in turn, is connected via T1 lines to East Tennessee State University's server which contains the library management system software and database.

By facilitating local library cooperation, the Watauga Regional Library Network enables cost savings particularly in the area of library management automation. The cost of a comparable, stand-alone system with the same services would have been approximately \$107,772, while the actual first-year, shared startup cost was \$9,260. The main reason for the large difference is cost sharing. The Watauga Regional Library Network also takes advantage of Federal discounts in telecommunications equipment, lines, and Internet access, allowing the public library systems to direct their resources elsewhere.

Section 3

Information

Production

Iris Glen Environmental Center

The Iris Glen Environmental Center is a solid waste landfill that employs a promising solution to waste management practices. Located near the center of town, the facility features a state-of-the-art liner system which satisfied contractual requirements and quelled community concerns. In addition, the liner system incorporates a methane gas recovery system that can provide future economic gains for the Center.

The Iris Glen Environmental Center is a government-controlled sanitary landfill commissioned in 1994, which is owned by Johnson City, Tennessee and operated by Waste Management, Inc. Located near the center of town, the facility handles solid waste from Johnson City as well as from many of the surrounding counties. Like other landfills, it has faced traditional concerns raised by the public sector such as types of material handled, water safety, traffic routes, and odor elimination. However, the Center has quelled the anxieties of the opposition by

using a state-of-the-art landfill liner system (Figure 3-1) that exceeds EPA regulations.

The Iris Glen Environmental Center is unique in that the natural geological make-up of its underlying materials provides an excellent composite site for constructing a man-made solid waste landfill. The chosen site was an abandoned shale mining operation with a 200- to 800-foot sevier shale bedrock. Shale is an excellent shock absorption material which prevents any disturbances within the liner system that may induce leakage of liquids or gases emitted by the waste. The liner system also incorporates an intricate plumbing system which recovers liquid waste leachate from solid waste. The liquid is stored in holding containers and treated prior to discharge into the City's sanitary sewer system. To date, however, the use of the methane gas recovery system has not been pursued due to the quality of the gas and the refining costs associated with it.

Since commissioned, the Iris Glen Environmental Center has operated without any significant safety issues and meets the requirements of the Solid Wastes Management Act of 1991. The Center also hosts educational sessions on waste management and recycling for teachers and students from local schools.

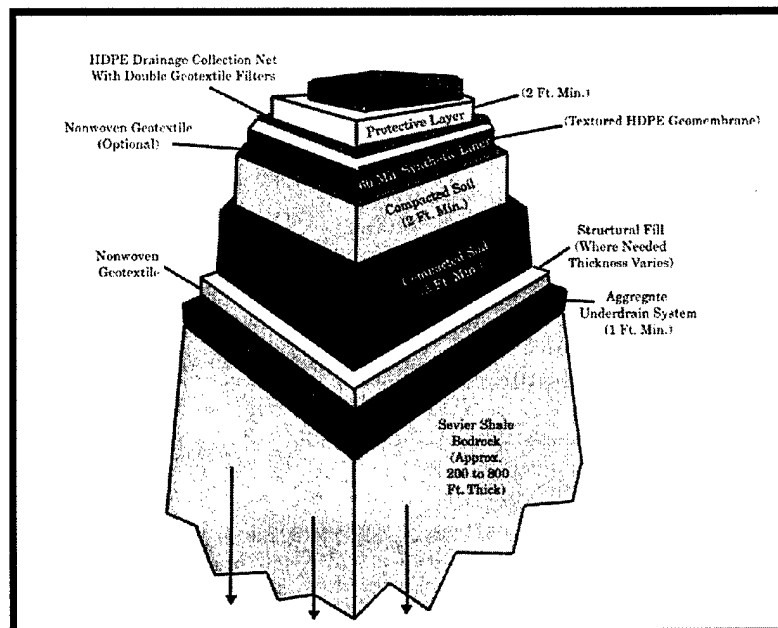


Figure 3-1. Dynamic Liner System

Facilities

Alternative Farming Center

The innovative Agriculture Department at Johnson County High School is taking agriculture well into the 21st century. Through its aquaculture farming program, the school has developed an affordable alternative for farmers and entrepreneurs who are in need of making significant changes in their farming methods. The Alternative Farming Center has received national attention and attracted visitors from across the U.S. and overseas to study the innovative methods.

Johnson County High School in Mountain City, Tennessee has developed and instituted a program to introduce aquaculture technology to former tobacco farmers in the local area. As tobacco demands decrease yearly in the less-than-ideal farming conditions of mountainous eastern Tennessee, an alternative to conventional farming techniques is needed. Without such an alternative, many small farms will be lost and the local economy will suffer. Aquaculture offers a low-tech, environmentally friendly, profitable solution to farmers.

At the Alternative Farming Center, students raise tilapia, a warm water edible fish, and koi, a water garden fish, in a 9,000 square foot facility. Water garden plants are grown on top of the water, hanging baskets flourish overhead, and bedding plants are raised on rolling tables over the fish. Hydroponic tomatoes, green peppers, and cucumbers are produced in the raceways, while hydroponic lettuce is also grown directly over the fish. The facility is heated and cooled via a geothermal system that maintains the required temperature of the 90,000-gallon facility. Using this alternative energy source ensures minimum maintenance and operating costs. The closed-loop water circulation system within the facility also eliminates environmental pollution as no discharge of water is required. Water intake to replace lost water due to evaporation is approximately 200 gallons per day.

Ideal growing conditions are maintained within the greenhouses, allowing hydroponic crops to be raised in approximately half the time of conventional farming. Students harvest 250 to 300 heads of Salina bibb lettuce weekly as well as 40 to 60 pounds of tomatoes. The tilapia grow to approximately 1.5 pounds in one year, making them market ready in a relatively short time. The school presently harvests over 25,000 pounds of tilapia per year.

As a school-based work development environment, the Alternative Farming Center is enabling students to take academic skills learned in the classroom and apply them in everyday applications to help advance technology. Over 400 of the school's approximately 700 students participate in this program. This program has received national attention and attracted visitors from over 30 states and several foreign countries to study the innovative methods. With proper market research and diversity of products being raised, the Alternative Farming Center could be an affordable alternative for farmers and entrepreneurs.

Management

Endowment Development

The Coalfield Water Development Fund provides grant assistance for water system construction in coalfield counties to cover monetary requirements excluded from Federal and state funding. To date, 25 water development projects have been initiated to address public health problems related to the quantity and quality of water.

Southwestern Virginia has always been a region rich in the history of coal mining production (coalfields). Like many of the Appalachian districts, the sparsely populated communities were confined to areas near mines or scattered throughout the region in remote rural settings. Although small cities eventually sprung up, they lacked sufficient economic development as needed to establish a healthy tax base for sustaining inclusive public water systems. Many homes used water from drilled earthen wells or captured through rainfall and stored in small private reservoirs. As safe substantial potable water, these sources were at the mercy of nature; susceptible to contamination from mining, farming, and lumbering operations; and could be wiped out by periods of severe drought. Failing septic systems then become a new source of anguish. This region also has limited, naturally occurring surface and groundwater resources. Transporting water was always an option, but hardly an economical solution to health-related issues that coexist with water problems. In 1995, 40 coalfield communities within a seven-county region of Virginia were identified as needing water restored or improved. Estimated costs for this project was \$142 million to provide service to 9,000 residences. Additional needs (e.g., septic/sanitation systems) have been identified since that time, adding to the financial requirements.

In 1996, a non-profit charitable organization known as the Coalfield Water Development Fund was developed in conjunction with the Mountain Empire Community College. The Fund provides grant assistance for water system construction in the coalfield counties to cover monetary requirements excluded from Federal and state funding. The grants are awarded from earnings on an endowment and from private contributions. The Coalfield Water Development Fund's endowment was initially funded by a \$293,000 grant from the EPA. The

endowment was further capitalized with \$10 million in loan funding, provided at 0% interest for 30 years, from Virginia's Drinking Water Revolving Loan Fund. These assets are invested in a combination of equities and bonds; only earnings from this fund are used. The Board of Directors of the Coalfield Water Development Fund has raised over \$1.3 million in private donations to fund project grants. Local governments as well as public and private water operators are eligible for application. The goals of the Fund are to expedite water development by providing gap financing; encouraging local investments and regional development; and addressing public health problems related to the quantity and quality of water.

As of December 2000, the Coalfield Water Development Fund awarded 25 project grants which total in excess of \$1.9 million with \$1.3 million from private sources. The Fund has also leveraged over \$14 million through partnerships that have provided improved water conditions for 3,783 residential water users, many of whom had no safe drinking water.

Quality Forum

The Quality Forum is an annual one-day conference held in the Tri-Cities Tennessee/Virginia Region since 1988. Its purpose is to increase awareness and provide assistance in regard to implementing continuous quality improvement.

The Quality Forum is an annual one-day conference used to increase awareness, promote interest, and demonstrate results of quality principles. Started in 1988, the Forum primarily focuses on education, healthcare, service organizations, government, and manufacturing. The event is planned by representatives from Northeast State Technical Community College, *The Business Journal of Tri-Cities*, the local chapter of the American Society for Quality, and other interested organizations.

The event's format consists of a morning keynote speaker(s) followed by two to three concurrent sessions, each consisting of at least eight presentations, throughout the day. Keynote speakers come from all walks of life and have included CEOs of major corporations and Tennessee Quality Award winners. Another aspect of the event is the Quality Showcase where companies share their success stories through posters and manned exhibits. Participants are chosen by the planning team. Compa-

nies interested in this segment of the Forum submit detailed abstracts on their spotlighted project or problem. The Quality Forum, held in Spring, keeps attendee fees to a minimum by charging only for lunch and materials. In addition, high schools are invited to send a team of students to the Forum at no charge. The cost is covered by private contributions and the generous support of sponsors.

The Quality Forum is open to everyone, but particularly targets those in the Tri-Cities Tennessee/Virginia Region. The Forum attracted 75 attendees during its first year, and attendance for 2001 is anticipated at 450 to 500 participants.

Strategic Plan for Economic Development

The Strategic Plan for Economic Development is a work-in-process program for planning the future and preserving the past of Johnson County, Tennessee. The Plan is addressing five initiatives: land use/infrastructure; environment; workforce development; employment; and community.

Johnson County, Tennessee has a total population of 13,766. Since the mid-1980s, the County has suffered a net loss of over 3,000 jobs. This significant impact has produced a negative ripple effect throughout the area including the closure of the County's only hospital in 1998. National issues on tobacco further complicated the situation regarding the future outlook of local farmers. Each day, more than 2,000 workers commute to other counties with only 100 coming into Johnson County. A strategic economic program was needed to plan the future and preserve the past of the County.

East Tennessee State University and the First Tennessee Development District enjoy a long-standing partnership that, in 1999, resulted in the U.S. Economic Development Administration issuing a grant for the partners to develop a Strategic Plan for Johnson County. The Plan is being managed by a demographically representative planning team, and addresses five initiatives: land use/infrastructure; environment; workforce development; employment; and community. Action plans detailing the process on each initiative are nearing completion.

The Strategic Plan for Economic Development has already produced positive results. As a result of the planning team's efforts so far, Johnson County has been designated as a Champion Community. This designation makes the County eligible for

additional resources. A regional community/technical college has committed to establishing local post-secondary courses by June 2001. Several Federal and state agencies have also offered technical and financial assistance to meet the projected out-

comes of several action plan items. Two new wood product manufacturers have started manufacturing operations, taking advantage of the County's timber resources.

Appendix A

Table of Acronyms

No acronyms were used in this report.

Appendix B

BMP Survey Team

Team Member	Activity	Function
Larry Robertson (812) 854-5336	Crane Division Naval Surface Warfare Center Crane, IN	Team Chairman
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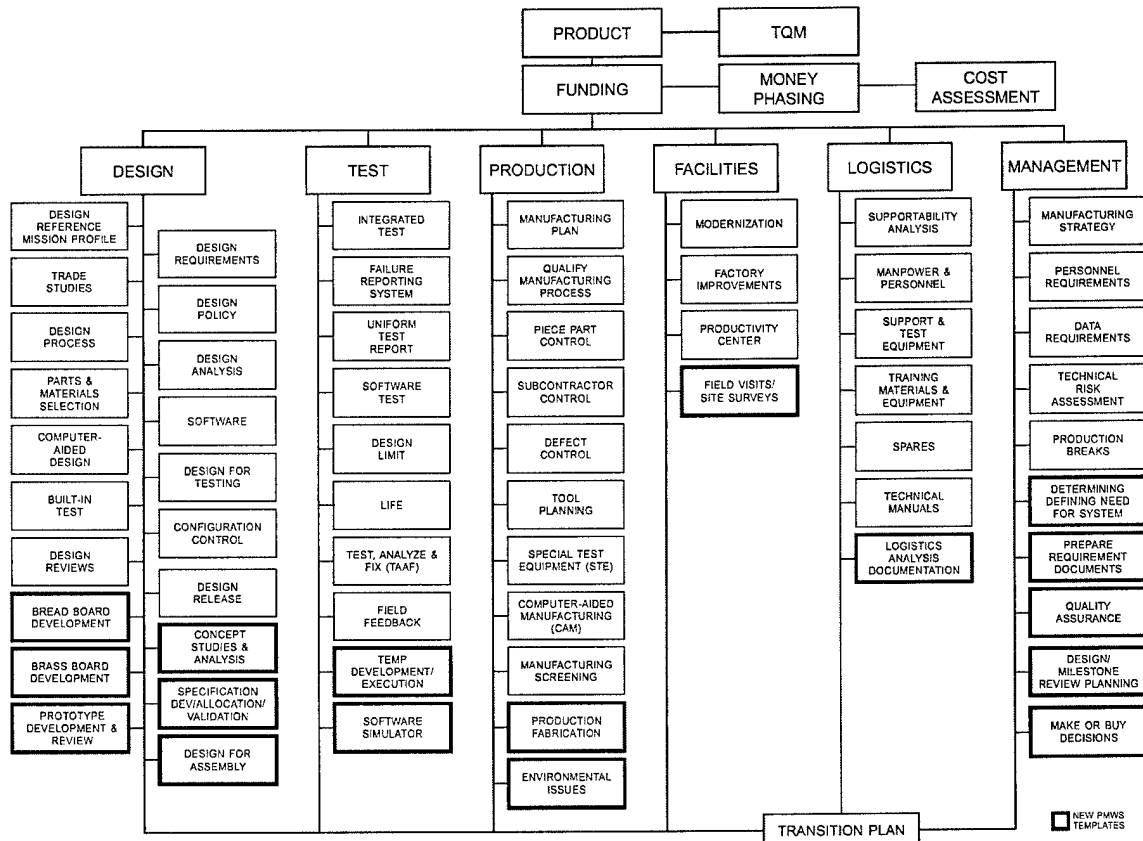
Appendix C

Critical Path Templates and BMP Templates

This survey was structured around and concentrated on the functional areas of design, test, production, facilities, logistics, and management as presented in the Department of Defense 4245.7-M, *Transition from Development to Production* document. This publication defines the proper tools—or templates—that constitute the critical path for a successful material acquisition program. It describes techniques for improving the acquisition process by addressing it as an *industrial* process that focuses on the product's design, test, and production phases which are interrelated and interdependent disciplines.

The BMP program has continued to build on this knowledge base by developing 17 new templates that complement the existing DOD 4245.7-M templates. These BMP templates address new or emerging technologies and processes.

“CRITICAL PATH TEMPLATES FOR TRANSITION FROM DEVELOPMENT TO PRODUCTION”



Appendix D

The Program Manager's WorkStation

The Program Manager's WorkStation (PMWS) is an electronic suite of tools designed to provide timely acquisition and engineering information to the user. The main components of PMWS are KnowHow; the Technical Risk Identification and Mitigation System (TRIMS); and the BMP Database. These tools complement one another and provide users with the *knowledge, insight, and experience* to make informed decisions through all phases of product development, production, and beyond.

KnowHow provides knowledge as an electronic library of technical reference handbooks, guidelines, and acquisition publications which covers a variety of engineering topics including the DOD 5000 series. The electronic collection consists of expert systems and simple digital books. In expert systems, KnowHow prompts the user to answer a series of questions to determine where the question is within a program's development. Recommendations are provided based on the book being used. In simple digital books, KnowHow leads the user through the process via an electronic table of contents to determine which books in the library will be the most helpful. The program also features a fuzzy logic text search capability so users can locate specific information by typing in keywords. KnowHow can reduce document search times by up to 95%.

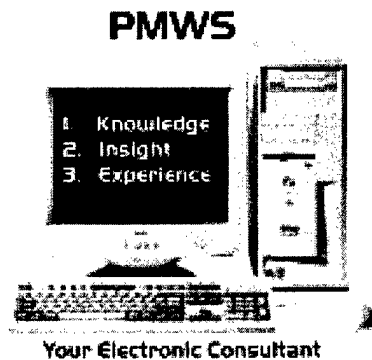
TRIMS provides insight as a knowledge-based tool that measures technical risk management rather than cost and schedule. Cost and schedule overruns are downstream indicators of technical problems. Programs generally have had process problems long before the technical problem is

identified. To avoid this progression, TRIMS operates as a process-oriented tool based on a solid Systems Engineering approach. Process analysis and monitoring provide the earliest possible indication of potential problems. Early identification provides the time necessary to apply corrective actions, thereby preventing problems and mitigating their impact. TRIMS is extremely user-friendly and tailorable. This tool identifies areas of risk; tracks program goals and responsibilities; and can generate a variety of reports to meet the user's needs.

The **BMP Database** provides experience as a unique, one-of-a-kind resource. This database contains more than 2,500 best practices that have been verified and documented by an independent team of experts during BMP surveys. BMP publishes its findings in survey reports and provides the user with basic background, process descriptions, metrics and lessons learned, and a Point of Contact for further information. The BMP Database features a searching capability so users can locate specific topics by typing in keywords. Users can either view the results on screen or print them as individual abstracts, a

single report, or a series of reports. The database can also be downloaded, run on-line, or purchased on CD-ROM from the BMP Center of Excellence. The BMP Database continues to grow as new surveys are completed. Additionally, the database is reviewed every other year by a BMP core team of experts to ensure the information remains current.

For additional information on PMWS, please contact the Help Desk at (301) 403-8179, or visit the BMP web site at <http://www.bmpcoe.org>.



Appendix E

Best Manufacturing Practices Satellite Centers

There are currently eight Best Manufacturing Practices (BMP) satellite centers that provide representation for and awareness of the BMP program to regional industry, government and academic institutions. The centers also promote the use of BMP with regional Manufacturing Technology Centers. Regional manufacturers can take advantage of the BMP satellite centers to help resolve problems, as the centers host informative, one-day regional workshops that focus on specific technical issues.

Center representatives also conduct BMP lectures at regional colleges and universities; maintain lists of experts who are potential survey team members; provide team member training; and train regional personnel in the use of BMP resources.

The eight BMP satellite centers include:

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Appendix F

Navy Manufacturing Technology Centers of Excellence

The Navy Manufacturing Technology Program has established Centers of Excellence (COEs) to provide focal points for the development and technology transfer of new manufacturing processes and equipment in a cooperative environment with industry, academia, and the Navy industrial facilities and laboratories. These consortium-structured COEs serve as corporate residences of expertise in particular technological areas. The following list provides a description and point of contact for each COE.

Best Manufacturing Practices Center of Excellence

The Best Manufacturing Practices Center of Excellence (BMPCOE) provides a national resource to identify and share best manufacturing and business practices being used throughout government, industry, and academia. The BMPCOE was established by the Office of Naval Research's BMP Program, the Department of Commerce, and the University of Maryland at College Park. By improving the use of existing technology, promoting the introduction of improved technologies, and providing non-competitive means to address common problems, the BMPCOE has become a significant factor to counter foreign competition.

Point of Contact:
Anne Marie T. SuPrise, Ph.D.
Best Manufacturing Practices Center of Excellence
4321 Hartwick Road
Suite 400
College Park, MD 20740
Phone: (301) 403-8100
FAX: (301) 403-8180
E-mail: annemari@bmpcoe.org

Institute for Manufacturing and Sustainment Technologies

The Institute for Manufacturing and Sustainment Technologies (iMAST) is located at the Pennsylvania State University's Applied Research Laboratory. iMAST's primary objective is to address challenges relative to Navy and Marine Corps weapon system platforms in the areas of mechanical drive transmission technologies, materials processing technologies, laser processing technologies, advanced composites technologies, and repair technologies.

Point of Contact:
Mr. Robert Cook
Institute for Manufacturing and Sustainment Technologies
APL Penn State
P.O. Box 30
State College, PA 16804-0030
Phone: (814) 863-3880
FAX: (814) 863-1183
E-mail: rbc5@psu.edu

SCRA Composites Manufacturing Technology Center

The Composites Manufacturing Technology Center (CMTC) is one of two Centers of Excellence for the Navy's Composites Manufacturing Technology Program. The South Carolina Research Authority (SCRA) operates the CMTC and The Composites Consortium (TCC) serves as the technology resource. The TCC has strong, in-depth knowledge and experience in composites manufacturing technology. The SCRA/CMTC provides a national resource for the development and dissemination of composites manufacturing technology to defense contractors and subcontractors.

Point of Contact:
Mr. Henry Watson
SCRA Composites Manufacturing Technology Center
100 Fluor Daniel Engineering Building
Clemson, SC 29634-5726
Phone: (864) 710-2736
FAX: (864) 656-4435
E-mail: watson@scra.org

NACC Center of Excellence for Composites Manufacturing Technology

The Center of Excellence for Composites Manufacturing Technology (CECMT) is one of two Centers of Excellence for the Navy's Composites Manufacturing Technology Program. The North American Composites Consortium (NACC) operates the CECMT and The Composites Consortium (TCC) serves as

the technology resource. The TCC has strong, in-depth knowledge and experience in composites manufacturing technology. The NACC/CECMT provides a national resource for the development and dissemination of composites manufacturing technology to defense contractors and subcontractors.

Point of Contact:
Mr. James Ray
Center of Excellence for Composites Manufacturing Technology
c/o NACC, Inc.
103 Trade Zone Drive, Suite 26C
West Columbia, SC 29170
Phone: (803) 822-3708
FAX: (803) 822-3730
E-mail: jrglcc@glcc.org

Electronics Manufacturing Productivity Facility

The Electronics Manufacturing Productivity Facility (EMPF) identifies, develops, and transfers innovative electronics manufacturing processes to domestic firms in support of the manufacture of affordable military systems. The EMPF operates as a consortium comprised of government, industry, and academic participants led by the American Competitiveness Institute under a Cooperative Agreement with the Navy.

Point of Contact:
Mr. Alan Criswell
Electronics Manufacturing Productivity Facility
One International Plaza, Suite 600
Philadelphia, PA 19113
Phone: (610) 362-1200
FAX: (610) 362-1294
E-mail: criswell@aci-corp.org

Electro-Optics Center

The Electro-Optics Center (EOC) is a national consortium of electro-optics industrial companies, universities, and government research centers that share their electro-optics expertise and capabilities through project teams focused on Navy requirements. Through its capability for national electronic communication and rapid reaction and response, the EOC can address issues of immediate concern to the Navy Systems Commands. The EOC is managed by the Pennsylvania State University's Applied Research Laboratory.

Point of Contact:
Dr. Karl Harris
Electro-Optics Center
West Hills Industrial Park
77 Glade Drive
Kittanning, PA 16201
Phone: (724) 545-9700
FAX: (724) 545-9797
E-mail: kharris@psu.edu

Navy Joining Center

The Navy Joining Center (NJC) provides a national resource for the development of materials joining expertise and the deployment of emerging manufacturing technologies to Navy contractors, subcontractors, and other activities. The NJC works with the Navy to determine and evaluate joining technology requirements and conduct technology development and deployment projects to address these issues. The NJC is operated by the Edison Welding Institute.

Point of Contact:
Mr. David P. Edmonds
Navy Joining Center
1250 Arthur E. Adams Drive
Columbus, OH 43221-3585
Phone: (614) 688-5096
FAX: (614) 688-5001
E-mail: dave_edmonds@ewi.org

National Center for Excellence in Metalworking Technology

The National Center for Excellence in Metalworking Technology (NCEMT) provides a national center for the development, dissemination, and implementation of advanced technologies for metalworking products and processes. Operated by the Concurrent Technologies Corporation, the NCEMT helps the Navy and defense contractors improve manufacturing productivity and part reliability through development, deployment, training, and education for advanced metalworking technologies.

Point of Contact:
Mr. Richard Henry
National Center for Excellence in Metalworking Technology
c/o Concurrent Technologies Corporation
100 CTC Drive
Johnstown, PA 15904-3374
Phone: (814) 269-2532
FAX: (814) 269-2501
E-mail: henry@ctc.com

Energetics Manufacturing Technology Center

The Energetics Manufacturing Technology Center (EMTC) addresses unique manufacturing processes and problems of the energetics industrial base to ensure the availability of affordable, quality, and safe energetics. The EMTC's focus is on technologies to reduce manufacturing costs, improve product quality and reliability, and develop environmentally benign manufacturing processes. The EMTC is located at the Indian Head Division of the Naval Surface Warfare Center.

Point of Contact:

Mr. John Brough

Energetics Manufacturing Technology Center

Indian Head Division

Naval Surface Warfare Center

100 Strauss Avenue

Building D326, Room 227

Indian Head, MD 20640-5035

Phone: (301) 744-4417

DSN: 354-4417

FAX: (301) 744-4187

E-mail: broughja@ih.navy.mil

Gulf Coast Region Maritime Technology Center

The Gulf Coast Region Maritime Technology Center (GCRMTC) fosters competition in shipbuilding technology through cooperation with the U.S. Navy, representatives of the maritime industries, and various academic and private research centers throughout the country. Located at the University of New Orleans, the GCRMTC focuses on improving design and production technologies for shipbuilding, reducing material costs, reducing total ownership costs, providing education and training, and improving environmental engineering and management.

Point of Contact:

Dr. John Crisp, P.E.

Gulf Coast Region Maritime Technology Center

University of New Orleans

College of Engineering

Room EN-212

New Orleans, LA 70148

Phone: (504) 280-3871

FAX: (504) 280-3898

E-mail: jcrisp@uno.edu

Appendix G

Completed Surveys

As of this publication, 123 surveys have been conducted and published by BMP at the companies listed below. Copies of older survey reports may be obtained through DTIC or by accessing the BMP web site. Requests for copies of recent survey reports or inquiries regarding BMP may be directed to:

Best Manufacturing Practices Program
4321 Hartwick Rd., Suite 400
College Park, MD 20740
Attn: Anne Marie T. SuPrise, Ph.D., Director
Telephone: 1-800-789-4267
FAX: (301) 403-8180
annemari@bmpcoe.org

1985	Litton Guidance & Control Systems Division - Woodland Hills, CA
1986	Honeywell, Incorporated Undersea Systems Division - Hopkins, MN (now Alliant TechSystems, Inc.) Texas Instruments Defense Systems & Electronics Group - Lewisville, TX General Dynamics Pomona Division - Pomona, CA Harris Corporation Government Support Systems Division - Syosset, NY IBM Corporation Federal Systems Division - Owego, NY Control Data Corporation Government Systems Division - Minneapolis, MN
1987	Hughes Aircraft Company Radar Systems Group - Los Angeles, CA ITT Avionics Division - Clifton, NJ Rockwell International Corporation Collins Defense Communications - Cedar Rapids, IA UNISYS Computer Systems Division - St. Paul, MN
1988	Motorola Government Electronics Group - Scottsdale, AZ General Dynamics Fort Worth Division - Fort Worth, TX Texas Instruments Defense Systems & Electronics Group - Dallas, TX Hughes Aircraft Company Missile Systems Group - Tucson, AZ Bell Helicopter Textron, Inc. - Fort Worth, TX Litton Data Systems Division - Van Nuys, CA GTE C ³ Systems Sector - Needham Heights, MA
1989	McDonnell-Douglas Corporation McDonnell Aircraft Company - St. Louis, MO Northrop Corporation Aircraft Division - Hawthorne, CA Litton Applied Technology Division - San Jose, CA Litton Amecom Division - College Park, MD Standard Industries - LaMirada, CA Engineered Circuit Research, Incorporated - Milpitas, CA Teledyne Industries Incorporated Electronics Division - Newbury Park, CA Lockheed Aeronautical Systems Company - Marietta, GA Lockheed Missile Systems Division - Sunnyvale, CA (now Lockheed Martin Missiles and Space) Westinghouse Electronic Systems Group - Baltimore, MD (now Northrop Grumman Corporation) General Electric Naval & Drive Turbine Systems - Fitchburg, MA Rockwell Autonetics Electronics Systems - Anaheim, CA (now Boeing North American A&MSD) TRICOR Systems, Incorporated - Elgin, IL
1990	Hughes Aircraft Company Ground Systems Group - Fullerton, CA TRW Military Electronics and Avionics Division - San Diego, CA MechTronics of Arizona, Inc. - Phoenix, AZ Boeing Aerospace & Electronics - Corinth, TX Technology Matrix Consortium - Traverse City, MI Textron Lycoming - Stratford, CT

1991	<i>Resurvey of Litton Guidance & Control Systems Division</i> - Woodland Hills, CA Norden Systems, Inc. - Norwalk, CT (now Northrop Grumman Norden Systems) Naval Avionics Center - Indianapolis, IN United Electric Controls - Watertown, MA Kurt Manufacturing Co. - Minneapolis, MN MagneTek Defense Systems - Anaheim, CA (now Power Paragon, Inc.) Raytheon Missile Systems Division - Andover, MA AT&T Federal Systems Advanced Technologies and AT&T Bell Laboratories - Greensboro, NC and Whippany, NJ <i>Resurvey of Texas Instruments Defense Systems & Electronics Group</i> - Lewisville, TX
1992	Tandem Computers - Cupertino, CA Charleston Naval Shipyard - Charleston, SC Conax Florida Corporation - St. Petersburg, FL Texas Instruments Semiconductor Group Military Products - Midland, TX Hewlett-Packard Palo Alto Fabrication Center - Palo Alto, CA Watervliet U.S. Army Arsenal - Watervliet, NY Digital Equipment Company Enclosures Business - Westfield, MA and Maynard, MA Computing Devices International - Minneapolis, MN (now General Dynamics Information Systems) <i>(Resurvey of Control Data Corporation Government Systems Division)</i> Naval Aviation Depot Naval Air Station - Pensacola, FL
1993	NASA Marshall Space Flight Center - Huntsville, AL Naval Aviation Depot Naval Air Station - Jacksonville, FL Department of Energy Oak Ridge Facilities (Operated by Martin Marietta Energy Systems, Inc.) - Oak Ridge, TN McDonnell Douglas Aerospace - Huntington Beach, CA (now Boeing Space Systems) Crane Division Naval Surface Warfare Center - Crane, IN and Louisville, KY Philadelphia Naval Shipyard - Philadelphia, PA R. J. Reynolds Tobacco Company - Winston-Salem, NC Crystal Gateway Marriott Hotel - Arlington, VA Hamilton Standard Electronic Manufacturing Facility - Farmington, CT Alpha Industries, Inc. - Methuen, MA
1994	Harris Semiconductor - Palm Bay, FL (now Intersil Corporation) United Defense, L.P. Ground Systems Division - San Jose, CA Naval Undersea Warfare Center Division Keyport - Keyport, WA Mason & Hanger - Silas Mason Co., Inc. - Middletown, IA Kaiser Electronics - San Jose, CA U.S. Army Combat Systems Test Activity - Aberdeen, MD (now Aberdeen Test Center) Stafford County Public Schools - Stafford County, VA
1995	Sandia National Laboratories - Albuquerque, NM Rockwell Collins Avionics & Communications Division - Cedar Rapids, IA (now Rockwell Collins, Inc.) <i>(Resurvey of Rockwell International Corporation Collins Defense Communications)</i> Lockheed Martin Electronics & Missiles - Orlando, FL McDonnell Douglas Aerospace (St. Louis) - St. Louis, MO (now Boeing Aircraft and Missiles) <i>(Resurvey of McDonnell-Douglas Corporation McDonnell Aircraft Company)</i> Dayton Parts, Inc. - Harrisburg, PA Wainwright Industries - St. Peters, MO Lockheed Martin Tactical Aircraft Systems - Fort Worth, TX <i>(Resurvey of General Dynamics Fort Worth Division)</i> Lockheed Martin Government Electronic Systems - Moorestown, NJ Sacramento Manufacturing and Services Division - Sacramento, CA JLG Industries, Inc. - McConnellsburg, PA
1996	City of Chattanooga - Chattanooga, TN Mason & Hanger Corporation - Pantex Plant - Amarillo, TX Nascote Industries, Inc. - Nashville, IL Weirton Steel Corporation - Weirton, WV NASA Kennedy Space Center - Cape Canaveral, FL <i>Resurvey of Department of Energy, Oak Ridge Operations</i> - Oak Ridge, TN

1997	Headquarters, U.S. Army Industrial Operations Command - Rock Island, IL SAE International and Performance Review Institute - Warrendale, PA Polaroid Corporation - Waltham, MA Cincinnati Milacron, Inc. - Cincinnati, OH Lawrence Livermore National Laboratory - Livermore, CA Sharretts Plating Company, Inc. - Emigsville, PA Thermacore, Inc. - Lancaster, PA Rock Island Arsenal - Rock Island, IL Northrop Grumman Corporation - El Segundo, CA <i>(Resurvey of Northrop Corporation Aircraft Division)</i> Letterkenny Army Depot - Chambersburg, PA Elizabethtown College - Elizabethtown, PA Tooele Army Depot - Tooele, UT
1998	United Electric Controls - Watertown, MA Strite Industries Limited - Cambridge, Ontario, Canada Northrop Grumman Corporation - El Segundo, CA Corpus Christi Army Depot - Corpus Christi, TX Anniston Army Depot - Anniston, AL Naval Air Warfare Center, Lakehurst - Lakehurst, NJ Sierra Army Depot - Herlong, CA ITT Industries Aerospace/Communications Division - Fort Wayne, IN Raytheon Missile Systems Company - Tucson, AZ Naval Aviation Depot North Island - San Diego, CA U.S.S. <i>Carl Vinson</i> (CVN-70) - Commander Naval Air Force, U.S. Pacific Fleet Tobyhanna Army Depot - Tobyhanna, PA
1999	Wilton Armetale - Mount Joy, PA Applied Research Laboratory, Pennsylvania State University - State College, PA Electric Boat Corporation, Quonset Point Facility - North Kingstown, RI <i>Resurvey of NASA Marshall Space Flight Center</i> - Huntsville, AL Orenda Turbines, Division of Magellan Aerospace Corporation - Mississauga, Ontario, Canada
2000	Northrop Grumman, Defensive Systems Division - Rolling Meadows, IL Crane Army Ammunition Activity - Crane, IN Naval Sea Logistics Center, Detachment Portsmouth - Portsmouth, NH Stryker Howmedica Osteonics - Allendale, NJ
2001	The Tri-Cities Tennessee/Virginia Region - Johnson City, TN